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ABSTRACT

This report reviews principles and techniques of health appraisal in schools. Discussed are the maintenance and use of school health records, communication between school personnel and professional health personnel, and teacher observation. Screening tests for visual and hearing defects are described in detail. Guidelines are given for nurse-teacher conferences, physicians evaluations, and dental examination procedures. Appendices give additional details of screening procedures, and instructions for using weight and height charts. (EB)

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health appraisal of school children

a report ... of the joint committee on health problems in education of the national education association and the american medical association

4th Edition 1969

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HEALTH APPRAISAL OF SCHOOL CHILDREN

Standards for Determining the Health Status of School Children—Through the Cooperation of Parents, Teachers, School Administrators, Physicians, Dentists, Nurses and Others.

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Edited by
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HEALTH APPRAISAL OF SCHOOL CHILDREN

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PRINCIPLES OF HEALTH APPRAISAL

In every school throughout the country the health of pupils is appraised every day. Casual, informal appraisal may take the form of teacher statements such as, "Fred is a fine, healthy boy" or "What is wrong with Mary? She always looks tired." Such limited judgments of health have value, but a greater value derives from a well-planned and executed health appraisal program.

Health appraisal includes such procedures as teacher observation, recording of the health history, screening tests, measurements of growth and development, diagnostic tests as the tuberculin test, chest X-ray and selected laboratory tests, teacher-nurse and nurse-parent conferences, and even psychological and psychiatric evaluation. Personnel include the teacher, nurse, physician and dentist, psychiatrist and psychologist, counselors, social workers and many others concerned with pupil personnel services. The pupil's personal physician and dentist and even his parents are considered appraisal personnel.

Thus, health appraisal is a cooperative process in which many individuals share responsibility and concern for the health evaluation of children and the subsequent management of identified health problems by appropriate and accepted methods.

Ideally each person on the health appraisal team supplements the others involved and their united effort is child centered. Teacher and parent observation of the child's appearance and behavior and the notation of any changes are continuous. Periodically, height and weight may be measured to determine growth, while at longer intervals screening tests for the acuity of vision and hearing are performed.

At frequent intervals the classroom teacher and the nurse serving the school confer with each other, and with others concerned with the child, to evaluate observations, to explain special needs of a particular child, and to determine which children should be referred to parents and other health personnel for special attention.

At suitable intervals during the school years each child should be seen by a physician, preferably his own personal physician, for a medical examination and review. In some cases it will be a clinic or group. This examination includes coordination of the observations of parents, teachers, nurses and others who have had regular contacts with the child since his previous medical examination.

All available records relating in any way to the physical or emotional health of the child or youth should be assembled for use by the physician before the examination.

It is important for young children to be accompanied by a parent at the time of their medical examination. This is desirable whether the examination is in the doctor's office or at school. Although the rate of examinations is slowed down because the physician must take time to talk with each parent, it provides an opportunity for parents to get first-hand interpretation of the physician's findings. Spending time informing parents about the health problems of children influences them to seek additional treatment if needed and brings greater returns than the same amount of time spent performing additional examinations, or later getting the child to a doctor for treatment following a school medical examination.

All appraisal efforts will be wasted or ineffective unless children in need of care are treated by qualified professional persons. Community agencies are called upon to assist families unable to finance this service for a child. If adequate facilities are not available it is the responsibility of the nurse and other school health personnel in cooperation with appropriate agencies in the community to initiate steps to secure facilities needed.

Follow-through that meets the health needs of the child is the ultimate objective of all health appraisal. When screening programs are planned, follow-up of the findings should be planned at the same time.

DEFINITIONS

The following definitions or explanations of terminology are used in all Joint Committee publications.

Health, (for the purposes of this document) is defined as a state of feeling well in body, mind, and spirit, together with a sense of reserve power. It is based on normal functioning of the tissues and organs of the body, a practical understanding of the principles of healthful living, and a harmonious adjustment to the physical and psychological environment, together with an attitude which regards health not as an end in itself, but a means to a richer life.*

School health program: The school health program includes numerous activities in which many persons participate. For convenience, the program is commonly divided into three interrelated parts — school health services, health education, and healthful school living.

School health services: The school procedures carried out by physicians, nurses, dentists, social workers, teachers and others to appraise, protect and promote the health of students and school personnel. Such procedures are designed (a) to appraise the health status of pupils and school personnel, (b) to counsel pupils, teachers, parents and others for the purpose of helping pupils obtain needed treatment or for arranging school programs in keeping with their abilities, (c) to help prevent and control communicable disease, (d) to provide emergency care for injury or sudden illness, (e) to promote optimum sanitary conditions and provide adequate and proper sanitary and safe facilities, and (f) to protect and promote the health of school personnel.

School health education: The process of providing learning experiences which favorably influence understandings, attitudes and conduct relating to individual and community health. Planned and conducted by teachers with consultations from physicians, dentists, nurses and other health personnel, school health education is an integral part of the curriculums of elementary and secondary schools.

Health appraisal: The process of determining the total health status of a pupil through such means as parent, teacher and nurse observations; screening tests; physical fitness tests; study of information concerning the pupil's past health experience; and medical and dental examinations. This concept recognizes that medical examinations include mental and emotional evaluation and that dental examinations are important in appraising pupil health. Such examinations, however, need to be supplemented by the other procedures mentioned.

School health counseling: The procedures by which physicians, nurses, counselors, teachers or others interpret to pupils or parents the nature and significance of a health problem. It helps pupils and their parents to better understand how to formulate a plan of action which will lead to the solution of a problem.

Health observation: A fundamental procedure in appraising pupil health involving sensitivity to changes in the way a pupil behaves or alteration in his color, gait or general appearance, which may be the first indication of physical and emotional problems.

Health inspection: Those formal procedures employed by nonmedical personnel in attempting to discover conditions indicating the need for referral

* Bauer, W. W., M.D., and Hull, T. G., Ph.D. Health Education of the Public. Philadelphia: Saunders, 1942.

of the child for medical, dental or other specialized care.

Screening tests: Procedures performed by teachers, nurses, technicians, nurse's aides or trained volunteers to provide a preliminary evaluation of the state of development or functioning of various body organs, and to uncover health problems not identified by observation of pupil appearance and behavior.

Medical examination: That phase of health appraisal which is reserved for the physician.

Personal physician: The physician who usually provides medical services to the individual whether in individual private practice, group practice or through a public clinic. He may be a general practitioner, internist, pediatrician, surgeon, psychiatrist or other Doctor of Medicine who serves children of school age.

School physician: A physician employed full time or part time by either a board of education or a board of health to supervise the school health service program, advise the school on medical matters, and serve as a resource for health instruction.

School nurse: A registered, professional nurse, preferably a graduate of a bachelor's or master's degree program, who meets certification requirements as established by the state certifying board, to serve as a school health consultant performing services such as improving, protecting, maintaining and promoting pupil health as recommended by the American Nurses Association and the American School Health Association.

HEALTH EDUCATION OPPORTUNITIES

Medical examinations and other appraisal procedures should contribute to pupils' education. Under proper circumstances, pupils gain an appreciation of the work of physicians, nurses and other health personnel. They learn to understand health problems and ways to protect and improve health. Appraisal personnel should be aware of and use health appraisal as an opportunity to educate as well as to appraise.

The teacher and nurse prepare students for screening procedures and physical examinations by classroom discussion and projects related to various aspects of the medical examination. At times the physician or a nurse is invited to the classroom to discuss with the children the values of a medical examination. In some instances a physician may demonstrate a medical examination using a volunteer pupil as a subject. Giving pupils an opportunity to learn the purposes and values of medical examinations and what they involve is one basis for quality health education.

CHILDREN WITH PROBLEMS

Some children have serious problems — physical, emotional or both — which may interfere, not only with their educational potential but also with life itself. When these children enter school, they gain a particularly valuable experience resulting from the liaison between the school's health services and the physicians or agencies caring for the child. The school physician, nurse or other responsible member of the pupil personnel staff should orient a child's physician to the school program. It is equally important that the child's health problem be carefully interpreted to the proper school staff member by his physician.

The use of the school physician to facilitate communication between the practicing physician and the school can be a significant factor in promoting better educational adjustment for the child.

The School Health Team

The team concerned with a pupil's health may include many professions in addition to medicine and its specialties. Their efforts can be coordinated into a special phase of "follow-up" which, when carefully fostered, advances co-operative endeavor to the benefit of the child.

The services commonly included in pupil personnel services, beyond those of the health service personnel, are those of counselors, psychologists, social workers, visiting teachers, speech and hearing therapists and attendance officers. Though all schools may not have all of these professional persons, most schools have some of them. Coordination of their work to prevent "fractionating" the pupil is the responsibility of school administration.

Follow-up to Meet Child Health Needs

The value of health appraisal procedures — observation by teachers and nurses, screening tests, medical and dental examinations — may be entirely lost if children are unable to obtain the care they need. When children with health problems do not receive the necessary counseling and treatment, their health is impaired, appraisal procedures become a waste of time, and their poor health experience is poor health education.

The indifference to or lack of understanding of the child's needs by the parents, and the inability of those working with the parents to motivate them to take the action necessary to improve the child's health, provides additional problems. Closely related to this is the situation in which some parents think their child has an uncorrectable defect and cannot be convinced otherwise.

Follow-up is ordinarily the responsibility of the health service personnel in the school, particularly the nurse. However, when nursing time is limited or not available, the classroom teacher or the school administrator must assume the responsibility for making parents aware of the health needs of children as they have been observed by the school. In some cases it may be advisable or necessary for the school to have a joint conference with the parents and the family physician to discuss the child's health problems.

HEALTH RECORDS IN THE SCHOOL

There is some difference of opinion among physicians, other school personnel and administrators regarding the content and need for school health records. The principal antagonists fear the entry of derogatory opinion and irrelevant information that may later injure the pupil. The protagonists believe records of health observations and examinations are essential baselines for health appraisal and the referral of pupils for definitive health care services. Resolution of this problem usually can be settled by entry of only pertinent information to be used in the interests of the pupil and by limiting access to the records to professional personnel and properly trained clerical staff.

Information about the health of the child is essential to the adjustment of the school program to pupil needs. The content, interpretation and use of school health records vary widely. The most valuable and acceptable health records are those designed jointly by representatives of the persons who will be using them. These include the school administrator, teachers, the nurse serving the school, the school physician where available, and local private physicians and dentists.

The cumulative health record — an individual card or folder for each pupil — is made out at the time he enters school and is transferred with him as he moves from grade to grade, from school to school, as well as from one community to another. The form of the record, the kind of information it

contains, and the way it is used are indicative of the effectiveness of the school health program. No single pattern of cumulative health record will fit every administrative pattern.

Data Included on Health Records

A pupil's cumulative health record contains all of the data useful to the school in promoting his health. It contains the result of teachers' observations, screening tests, significant facts from his health history, and the findings of medical and dental examinations. There will be notes on health counseling and the results of follow-up procedures.

In addition to data relating to health appraisal and health counseling, it is important to include information that would be helpful if the child should suffer an accident or sudden illness. This would include knowledge of where a parent can be located in an emergency, particularly when both parents work, as well as knowledge of whom to notify if a parent cannot be located. The name and phone number of the family physician and dentist, as well as the preferred hospital, also should be included.

Pupils' cumulative health records should contain the recommendations of the physician and other professionals but not necessarily the detailed findings of examinations. Recommendations relating to the effect of a pupil's health condition on his ability to participate in school activities or suggestions regarding modification of his school program should be included.

Considerable difference of opinion exists relative to where school health records shall be kept and who should keep them. This should be worked out locally in terms of how the records are to be used. The nurse is usually responsible for health records when she spends the greater portion of her time within the school. The administrative office is likely to maintain health records in conjunction with academic and other records of the pupil when the nurse visits the school with relative infrequency. In some schools duplicate health records (without medical examination details) are in the classroom.

Ideally, health records form the basis for health conferences among parents, nurses and teachers. They are used as background information by teachers who have children with special problems.

Use of Records

Records should be available only to authorized personnel. However, records should be accessible to teachers, principals, physicians, dentists, nurses, psychologists, social workers, and other professional personnel. The confidential nature of health records must be stressed with all school personnel, professional staff and non-professional clerical workers. The professional staff should receive instructions regarding the professional use of data they contain and the need to avoid misuse. Physicians and nurses may wish to establish a "confidential file" for data which in their opinion are not appropriate for inclusion on a child's regular health record.

As school records are used by professional personnel other than physicians and nurses, so also do physicians and nurses need to use records made by other personnel. Physicians and nurses counseling pupils regarding health matters should consider all aspects of health — physical, emotional and social. They need to know the results of intelligence tests and of other psychological tests, as well as all additional information about the pupil, his parents and his home gathered by the teacher, the counselor, the psychologist and the social worker. Only by integrating all available information can an accurate picture be obtained of a pupil's overall health.

COMMUNICATION AND THE TEAM CONCEPT

Failure to establish channels of communication between the physicians and dentists in the community and the schools, as well as between the parents and the schools, can result in misunderstanding and friction. To adjust its program to pupil needs, the school needs pertinent health interpretations about the child. When a child's personal physician fails to communicate his recommendations to the school, the school may feel the need for a medical examination at school. However, such use of the school physician constitutes unnecessary duplication of services.

The physician examining a pupil in his office may feel the need to perform certain screening procedures which have already been conducted at school unless appropriate data is transmitted to him in advance. The observations recorded by teacher or nurse are wasted unless the physician has them available to consider in conjunction with his own finding. This exchange of information among professional persons concerned with the school child is a problem that can be solved only by mutual agreement of the personnel or organizations involved.

COMMITTEES AND COUNCILS TO PROMOTE COOPERATION

Throughout the country committees, councils and other types of coordinating groups have been organized to facilitate interprofessional and interagency understanding and cooperation. Where such action is contemplated, emphasis should be placed on the function to be performed rather than on organizational structure. The committee or council is only a means to an end, the end being improved health for children and youth. The council or committee should begin its activities by considering existing problems.

A school health advisory council, closely allied with an organization representing community-wide interests, can be an effective group for promoting coordination, evaluating progress, and planning future development. The membership of a council or committee varies with the problems to which attention is to be given. Among physicians it is desirable to have the experience of the pediatrician in guiding examination policy for children. Likewise the ophthalmologist should contribute to policy regarding vision screening and the otologist to hearing screening.

Advisory committee and school health council structure and function are discussed in detail in other publications of the Joint Committee on Health Problems in Education, namely Suggested School Health Policies (1966), School Health Services (1964), and Health Education (1961). Teamwork in School Health (1962) published by the American Association for Health, Physical Education and Recreation is another valuable reference.

EVOLUTION OF HEALTH APPRAISAL

Health appraisal of school pupils began in the past century primarily as a means of locating and isolating children showing signs of communicable disease. Later, this emphasis shifted to a "getting-ready-for-school program" popularized by the "Summer Round-Up" of the National Congress of Parents and Teachers. The teaching of preventive medicine in medical schools, its emphasis in modern pediatrics, and the well-child conferences of local public health departments all have strengthened the concept of periodic health appraisal of children.

These developments were gradually reinforced by the emergence of definitive policies for the expanding number of school health programs and more emphasis on health education. Typical of the broadening philosophy are the

recommendations of the National Congress of Parents and Teachers, adopted in 1956, "supporting and encouraging a program of continuous health supervision of children from birth through their school experience," and recommending to its local units, "a promotional and educational program that will tend to bring children and their parents into effective contact with the health resources of the community. Wherever possible, these should be the physician and dentist who normally serve that child or family, whether they be working in private practice or in the community health service."*

TEACHER OBSERVATION

The elementary school boy or girl spends more of his waking hours with the classroom teacher than with any other adult, except his parents. Thus, the teacher occupies a unique position to observe the pupil's physical and emotional health as well as his academic accomplishments. He sees the child on his good days and his poor days, witnesses his successes and failures, observes his reactions to other children, is aware of any changes in appearance and behavior.

Health observation reflects the teacher's sensitivity to the developmental needs of children. The teacher, skilled in observation, detects deviations without interference with usual classroom responsibilities. Singling out those children who seem to have something wrong with their health is an essential teacher responsibility. Depending upon the problem, the teacher will make a mental reminder of those children who need further observation, or he will make immediate referral to the nurse or the person delegated to receive such referral.

Significant health observations and the actions taken concerning them should be recorded on the pupil's cumulative health record. These recordings should involve only significant observable variations in a pupil's appearance and behavior and not be judgmental or diagnostic. Among secondary school pupils, who are passing through a particularly critical period of growth, development, and social adjustment, the observant teacher can often detect those who are having serious problems.

The range of teacher observations is extensive. The following list, though incomplete, includes conditions that may be noted.

General Appearance—Very thin or obese, noticeable change in weight, unusually pale or flushed, poor posture, unkempt look, change in gait, lethargic and unresponsive or hyperactive.

Eyes — Crossed eyes; inflamed or watery eyes; squinting, frowning, or scowling; holding book too close to or too far from eyes; frequent sties, persistent unnecessary wearing of colored glasses.

Ears — Discharge from ears, turning head to hear, failure to hear well as indicated by unusual replies or failures to respond.

Nose and Throat — Persistent mouth breathing, enlarged glands in neck, frequent colds, persistent nasal discharge or sniffing, odor from nose or mouth.

Skin and Scalp — Rash on face or body, sores on face or body, numerous pimples, excessively dry or oily skin, nits on hair, bald spots, frequent scratching.

Teeth and Mouth — Irregular teeth, stained teeth, cracking of lips at corners of mouth, pale or blue lips, inflamed or bleeding gums.

* Helmholz, Henry F., M.D. "The Summer Round-Up Grows Up." (Guest Editorial) *Journal of the American Medical Association* 164: 52; May 4, 1957.

Behavior When Playing — Tires easily, becomes breathless following moderate activity, lack of interest or loss of interest in sports and games, unusual clumsiness or poor coordination, unusual excitability.

General Behavior — Docile and seclusive, drowsy, aggressive, depressed and unhappy, excessive daydreaming, remote, difficulty in working and playing with others, excessive thirst, frequent use of the toilet, unusual tenseness.

In addition to observing pupils, the teacher should give careful attention to pupil complaints. These may include pain, headache, feeling hot, dizziness, buzzing in the ears, sore throat, toothache, blurring of vision, or itching of the skin or scalp. Such complaints should never be discounted. They may be due to acute disease or to a physical impairment. Pupils with health complaints should be brought to the attention of parents in the same manner as those whose appearance or behavior deviates from normal. Usually this is by referral through the nurse or other personnel.

CHARACTERISTICS OF SCREENING TESTS

Screening tests, as a part of health appraisal, are preliminary evaluations of the state of development and function of various body organs. Performed by teachers, nurses, technicians, nurses aides or trained volunteers, they screen out those children needing diagnostic examination by professional health service personnel.

The popularity of community-wide screening tests, the concept of multiphasic screening, and the computerized performance of various blood tests and related procedures has raised a question among health administrators whether it is desirable to introduce into the school an appropriate battery of tests similar to those used for the discovery of chronic disease in older populations. The answer to this question hinges on certain factors, each of which must be weighed in relation to the specific procedure being evaluated.

1. IS THE TEST APPLICABLE TO THE HEALTH PROBLEMS OF CHILDREN OF SCHOOL AGE? The incidence of some conditions detectable by screening procedures is extremely low in boys and girls of school age. To give all pupils a test that reveals so few who have the condition is an inefficient method of case finding, and may be poor health education.

2. IS THE TEST MEDICALLY SOUND? Does the procedure provide information that is significant in determining health status? If findings are positive, will they lead toward diagnosis and suitable treatment when referred to the family physician? If findings are negative, will parents interpret this to mean that their child is "all right" in every way and neglect consultation for conditions not involved in the test? The possibility of overreferral, the proportion of missed cases, and faulty interpretation of tests when school-age children are screened are important considerations. Only those tests should be performed for which follow-up has been planned.

3. IS THE TEST EDUCATIONALLY SOUND? Is the test within the province of an educational institution? Can the test procedures be incorporated into the teaching program of the school, and can teachers prepare pupils properly for it? Will giving the test in the school lead to useful health practices in the postschool life of the child?

4. IS THE TEST ECONOMICALLY FEASIBLE? The costs of screening tests will vary in terms of the equipment needed, the technical personnel required to perform them, and the number of tests given. What will be the cost of the test in terms of the incidence of the condition being screened among school children? Are there less costly case-finding procedures? Since the school

health program has a limited budget, its health service functions must be justified financially.

5. IS THE TEST ACCEPTABLE PUBLIC RELATIONS? Will giving such tests in the school promote good relations among the school, the health department, the practicing physicians, the child himself, and the family? Because a significant number of children have no family physician and receive little or no medical care, it is argued that exposing these children to screening procedures will be educationally worthwhile even though the case-finding value of the tests may be disputed. Others think that screening tests enhance the opportunity for the school to exercise its responsibility for education concerning intelligent selection of a personal physician or other source of treatment by the child and family, and encourage the family to seek needed preventive and treatment services for the child.

The majority of physicians would not support a school or health department in a screening program involving tests that have not achieved general medical acceptance for school purposes. All screening procedures require medical interpretation. In no sense do these procedures take the place of the physician, regardless of who performs them.

Screening tests can be categorized relative to their known utility and value for school use. On the basis of experience some have proved of value, others have been found unsuited to the school-age group. Still others may be used if some special need or problem indicates their desirability in a particular community.

Screening tests of definite or proved value include those for the acuity of vision and hearing. The most common vision tests are the Snellen Chart with either letters or the E at twenty feet, the plus sphere test for ability to accommodate, the Maddox rod test or some similar check for muscle balance and at least once during the school career a test for color discrimination. The pure tone audiometer is the preferred screening test for hearing acuity.

Tests presently utilized which may or may not be of value often depend for their value upon the conditions under which they are used. The value of periodic measurements of growth recorded on a graph has been questioned as a screening device, although they have undeniable value as an educational device. And in some individual instances they may indicate need for professional services. Chest X-ray for tuberculosis detection earlier than the last year or two of high school produces too few cases in most schools to be practical. Tuberculin skin testing in schools is more effective since reactors may still be in contact with their infectors and thus lead to case finding.

Studies have proved some testing procedures to be of little or no value when performed in the schools. This is particularly true of routine testing of urine and blood, serological tests for syphilis, and urine and blood tests for certain vitamins. Occasionally a single test of a school or group of pupils may be justified to determine the prevalence of some condition in a school, but not routine repetition. Dental screening in the school is an ineffectual use of professional time since more than 90% of the pupils are known to need dental care before screening.

Some screening procedures of considerable value are presently not utilized. Among these are systematic review of absenteeism, health inventories of the child's health to be completed by his parents, screening by physical education teachers to detect postural conditions, and some physical fitness tests.

Many schools perform tests usually considered "nonmedical." The results should be known to the physician appraising the child and be included with other information in conferences of the school health team concerning any

given child. Such tests are physical performance tests, psychometric and intelligence tests.

Screening procedures and follow-through plans should be designed at the same time. One should perform only those tests which can be followed by referral for appropriate professional care.

In schools with a limited health service program, screening tests are usually the responsibility of the teacher. In a few instances, these may be carried on by outside agencies. However it usually is best if they can be done by school personnel, or by properly oriented volunteers or technicians serving the schools.

VISION SCREENING*

Vision screening involves observation to detect obvious eye disease and screening tests to detect possible refractive error. Eye disease may be evidenced by swelling of the lids, inflammation and redness, discharges, sties and other observable phenomena as well as pain, burning, photophobia and other subjective symptoms. Refractive errors that affect visual acuity are detected by various testing procedures that roughly measure the ability to see test objects at measured distances, either directly or through various systems of lenses.

Emphasis must be placed on the fact that school tests for visual acuity are screening tests and are not intended to diagnose the nature of eye defects. They reveal that a child does not see well, but the presence or absence of visual defects requiring correction cannot be determined by screening tests alone.

The Role of School Personnel

Since screening tests are not designed to be diagnostic, it is unnecessary and undesirable to have them given by a person who fits glasses. The use of such a person for this purpose would create the impression of a diagnostic examination. Moreover, it would be an unwise use of the time of such a person.

At times screening tests are given by a teacher and nurse team. The teacher thus gains information about his pupils' vision which enables him to correlate the results of the screening tests with his observations and to participate effectively in helping pupils obtain needed treatment. The greater the teacher's understanding of a pupil's visual problem the more interested he will be in the follow-up program.

In schools using trained volunteers or technicians in vision screening, means must be provided for the teacher to correlate his observations with the results to complete the criteria for referral.

Preparing Pupils for Vision Screening

Previous to vision testing, children should be informed concerning the purpose of the test and the procedures to be followed. With young children a demonstration of the test is appropriate. The teacher and class will peruse the educational implications. Older children may be interested in how the eyes function, the relationships between light and sight, contact lenses and how lenses help to improve vision, and a correlation of this information with their science studies. An effort should be made to answer all questions through class discussion or by direct answers.

The Snellen Test

For many years the Snellen test has been used by physicians and has been the most frequently used vision screening test in schools. It requires the reading

* Much of the following material has been adapted from Chapter IV "The Eyes and Vision Screening" SCHOOL HEALTH SERVICES. National Education Association and American Medical Association, Joint Committee on Health Problems in Education, Washington, D. C. the Associations, 1964.

of test objects (letters, numbers or symbols) of definite sizes on a chart from a measured distance of 20 feet. Each size is numbered to indicate the standard distance at which a person with normal visual acuity should be able to identify it. Hence, one is said to have adequate central visual acuity for distance if he can read the 20-foot line from a distance of 20 feet. It should be remembered that such a standard is not always possible for young children, even when their sight is normal for their stage of development.

For convenience, the results of the test are expressed as a fraction, the numerator indicating the distance of the child from the chart, and the denominator the smallest line read correctly. However, this is not a true fraction and cannot be interpreted to indicate the percentage of visual efficiency. For example, 20/30 indicates only that the 30-foot line is the smallest line read correctly at a distance of 20 feet. It actually represents 91.5 percent of visual efficiency. Generally, 20/20 is considered "normal vision." Those with a visual acuity of 20/15 may have an unusual degree of visual acuity; those with acuity of 20/30, 20/40 or less have below normal vision.

The Snellen test has several distinct advantages for use in school: It is inexpensive, requires no special electrical apparatus (although the amount of light on the chart should be controlled), is easy to administer, and takes an average of only about one minute per child. If the Snellen screening test is combined with careful parent and teacher observations, the majority of children who need to be referred for an eye examination will be identified.

The use of the Snellen test and other testing procedures is delineated in the appendix beginning on page 25.

Selecting Children to Be Referred for Eye Examination

With the test completed and results recorded, the next step is the selection of children to be referred for an eye examination. All children who have exhibited signs or symptoms of eye disease or defect should be referred without testing. Children failing the screening test should be retested before recommendations are made for referral. If the test findings persist, parents should be urged to secure professional eye examinations for children who are in the following categories:

(a) those who consistently exhibit symptoms of visual disturbance, regardless of the results of the Snellen test;
(b) children 8 years of age or older who have a visual acuity of 20/30 or less in either eye, with or without symptoms;
(c) children 7 years of age or less who have a visual acuity of 20/40 or less in either eye, with or without symptoms of eye trouble.

Standards for referral are not absolute. This is a set of optimum criteria. The economic status of the community and the availability of professional personnel to perform eye examinations may suggest their alteration. A more selective referral is necessary whenever there is a low probability of follow-through to professional care.

Obtaining Eye Care

Since one goal of follow-up is to help pupils secure a complete diagnostic examination by a qualified person, it is essential that all concerned with eye problems be familiar with the different kinds of persons who may be involved. Some of the major workers in this field and their qualifications are the following:

An ophthalmologist or oculist is a physician—an M.D.—who specializes in the diagnosis and treatment of defects and diseases of the eye, performing surgery where necessary or prescribing other types of treatment, including glasses.

An optometrist, a licensed nonmedical practitioner, measures refractive errors or irregularities in the size or shape of the eyeball or surface of the cornea, and eye muscle disturbances. The optometrist prescribes glasses and uses prisms and exercises only; he is not licensed to use drugs or perform surgery.

An optician grinds lenses, fits them into frames, and adjusts frames to the wearer.

When children are referred it should be explained that observations or screening tests suggest the presence of an eye problem. Whether a problem actually exists, and whether it is an optical defect correctable by glasses or a more serious condition, can be determined accurately only through a careful examination. Because of the popular misconception that glasses are the cure for all eye difficulties, care should be taken by those making referrals not to imply that glasses are needed.

Eye Examination

An examination by an eye physician is designed to study the functioning of all parts of the eye, to diagnose abnormal conditions, and to determine the procedures necessary to correct or alleviate them. In addition, an eye examination may furnish important clues to disturbances of general health.

An eye examination also includes recording of family and personal history of health and of eye difficulties, inspection of external and internal structure of the eyes and of surrounding tissues, and measurements of the various aspects of visual function.

The diagnosis of a refractive error is made in terms of the type and strength of lens required to neutralize the error and to permit sharp focusing of the image on the retina. To secure accurate measurement of refractive errors, it often is necessary to instill a drug called a cycloplegic, the use of which is limited to the medical doctor. This dilates the pupil and relaxes the muscles that regulate the shape of the lens. Use of this type of drug is particularly important in determining the extent of refractive errors in young people and is virtually always required when strabismus is present. A dilated pupil is essential when a complete examination of the eye is to be done.

Muscle balance may be tested in various ways. Tests are also made of fusion, the ability to integrate the image from both eyes, and sometimes of depth perception and color vision. When the need is indicated, the fields of vision (side vision) may be measured with an instrument called a perimeter or with a tangent screen.

Preschool Vision Screening

A child does not know how well he should see. He may have blurred vision, or see double, or use just one eye and still not complain because he doesn't know better. Since many eye ailments are not visible to the parent, visual care early in the preschool period may detect defects which can be corrected before harm is done. Such defects as crossed eyes and amblyopia or "lazy eye" can lead to unnecessary loss of vision in the affected eye if not detected and treated before the age of six.

The goal of an eye examination for every preschool child is desirable but not yet practical. To avoid tragic effects, vision testing is being increasingly included in the total health supervision of the preschool child. Vision screening of preschool children is often conducted as a project of a variety of civic organizations concerned with child health.

The conditions for program operation differ among communities and each community must establish vision screening programs that meet its own needs.

Information about preschool vision screening procedures* may be obtained from the National Society for the Prevention of Blindness, 79 Madison Avenue, New York, New York 10016.

HEARING SCREENING**

Information about the hearing ability of pupils may be obtained in many different ways. Sometimes a mother informs the teacher that a particular boy or girl does not hear well. The child's physician may have suggested that this information be given to school personnel. At other times, the teacher learns about pupils with hearing difficulties by observing their behavior in the classroom and noting their reactions to new situations. In most instances hearing impairments are identified by screening tests for auditory acuity, now known as identification audiometry, which are performed routinely in many school systems. Measurements of hearing acuity are made with an instrument called an audiometer.

Parent and Teacher Observation

Hearing impairment may be revealed by a child's appearance or behavior. A parent or teacher should suspect the presence of a hearing problem if a child presents one or more of the following conditions:

- Failure to respond to conversation when head is turned away,
- Cocking the head to one side,
- Failure to follow directions,
- Frequent requests for repetition of a word or sound,
- Faulty pronunciation of common words,
- Speaking too softly, too loudly or with an unusual voice quality,
- Difficulty in locating the source of sound,
- Unusual dependence on visual cues,
- Inattention, restlessness, aggressiveness or apathy,
- Unexplained decrease in school achievement.

Many of the above manifestations of hearing impairment can represent other kinds of problems, so such observations merely arouse suspicion concerning a pupil's hearing. They indicate the need for further study.

Although observations by parents and teachers will identify many instances of ear and hearing disorders, they will not uncover all cases of impaired hearing. Moderate hearing impairment in both ears or severe impairment in one ear may be present without the parent, teacher or pupil suspecting that a problem exists. For this reason a program of identification audiometry is necessary to identify pupils with hearing sensitivity less than normal.

Identification Audiometry†

The ideal in identification audiometry is to conduct a reliable test as early in life as possible, preferably in infancy, followed by a test of the preschool child so that hearing problems can be discovered and language retardation can be prevented as early as possible.

Even with these earlier tests, the school will desire information in the kindergarten and first grade about whether each child's hearing acuity will

*See also Appendix I, page 25.

**Much of the following material on hearing screening is adapted from Chapter 5 "Hearing Impairment and Hearing Testing," SCHOOL HEALTH SERVICES, a report of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, Second Edition, 1964.

†Committee on Identification Audiometry of the American Speech and Hearing Association, *Journal of Speech and Hearing Disorders*, Monograph Supplement #9, September, 1961, Edited by F. L. Dailey, Ph.D. (Much of this section has been quoted or paraphrased from portions of this monograph.)

allow him to handle typical school communications or whether special instruction is indicated. The basic audiogram accomplished in kindergarten or first grade will constitute a useful reference. At intervals during the child's school life, he should be re-examined to assure earliest possible treatment and to ensure that no hearing problem, invisible to the otoscope and insidious in onset, may unnecessarily become a handicap.

Justifications for identification audiometry are more evident between the ages of 5 and 16. The goal is to locate children who have even minimal hearing problems so that they may be referred for medical treatment at the earliest possible date. Programs should be designed to identify not only children with a chronic disability but also children who have difficulty during only certain times of the year. The period when a child may not be hearing well (as during a respiratory illness or a season with high pollen count) and consequently be functioning at a low level may be just the time when social and educational demands on him are great. Such children are among those who may mistakenly be labeled mentally retarded.

*Identification audiometry in the school-age population** is best described in two stages:

1. Screening audiometry, which involves testing in an abbreviated way of a large number of children. This identifies those with no apparent hearing problems and tentatively identifies those who may have hearing problems.
2. Test of minimal hearing sensitivity, a more detailed test by more highly trained personnel with more elaborate equipment for the final identification of those who should be referred to an otologist or other physician for a complete diagnostic work-up.

The first stage may involve either individual or group limited-frequency testing. It is strongly recommended that individual pure tone testing be planned for all grade levels wherever possible. Many experts believe that periodic screening on an individual basis is better than an annual screening using group procedures. If a choice must be made between group audiometry or none, group procedures are possible at least at third grade level and above.

In newly established programs an effort should be made to test all of the children during the first school year. Thereafter an adequate program includes aggressive attention to the possibility of hearing problems in the early school years. This can be implemented by annual testing in kindergarten and grades 1, 2 and 3. Less frequent testing can be planned in subsequent school years, but no child should experience more than a three-year interval between tests from grades 4 through 12. Accounting should be by child rather than grade.

In addition to routine periodicity, there should be opportunity for immediate testing of pupils new to the individual school or school district, pupils discovered by a previous test to have a hearing impairment, children with delayed or defective speech, pupils returning to school after a serious illness, those enrolled in adjustment or remedial classes, pupils who appear to be retarded, pupils having behavioral or emotional problems, and pupils referred by the classroom teacher for hearing testing.

Personnel involved in identification audiometry are at two levels, supervisory and technical. A supervising audiometrist should hold the certificate in hearing of the American Speech and Hearing Association or at least meet the requirements for that certificate. He selects and supervises the procedures and equipment, counsels with physicians and others and educates various segments of the public in acceptance of the program of identification audiometry.

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* See also Appendix II, page 27, for the procedures in Identification Audiometry.

At the second level audiometrists capable of performing both individual and group screening tests and individual threshold tests are employed. As a matter of economy, volunteer personnel (housewives, retired school teachers) who are motivated to this type of service, insightful in observing children's behavior, and capable of working easily with children, as well as amenable to the suggestions of the supervisor, may be selected and trained as testers. They should do only hearing testing, should not make evaluations and decisions, and should respect the confidentiality of the records.

Records of hearing testing should be made a part of the child's general health record. To be maximally useful records should be available to medical and educational personnel as well as to parents.

Referral

The program of hearing testing should provide for adequate medical consultation. The final steps in the appraisal and management of the individuals identified as probably having hearing impairment should be in the hands of medical personnel. An otological examination of such children is not just a desirable feature which hopefully can be arranged, but is a requirement if the program is to be effective.

Efforts should obviously be made to avoid referring for complete audiological and otological work-ups large numbers of children who turn out to have no medically or educationally significant hearing loss. However, it is better to err on the side of overreferral than to take a chance of underreferral.

When it has been determined that a child has a significant hearing loss as a result of the sequence of referrals, and when necessary medical and surgical treatment and follow-up have been provided, the audiological and medical findings of the otologist should be conveyed to the parents and the school personnel particularly concerned with the management of the child.

MEASURING PHYSICAL GROWTH

Weighing and measuring is a procedure usually correlated with health education relating to physical growth. It is an activity that young pupils enjoy so much that it has been said, "One way to make a friend out of a child is to measure him." Older pupils, too, want to know how tall they are and how much they weigh.

Good practice is to weigh and measure pupils twice—about six months apart—during the school year. Weight should be measured with shoes and coats removed and recorded to the nearest half-pound. Height should be measured with shoes removed and recorded to the nearest one-fourth inch. Measurement of young children should be made by the teacher or volunteer; older students may measure themselves under teacher supervision.

Records of height and weight provide information concerning growth. Comparison of measurements among pupils should be discussed. Since children of any chronological age are in different stages of maturity and growth, this needs understanding so that certain students do not suffer unnecessarily. Also, the variations in body build between the ectomorph and the endomorph should be considered in judging the normality of weight in relation to height. Emphasis should be placed on the individuality of each pupil and on his present measurements in relation to his previous measurements. Pupils who, over a period of several months, lose weight, show no gain, or gain excessively should be examined by a physician to see if a health problem is involved.

Interest aroused in pupils when they are weighed and measured can be used as a basis for education about how growth takes place and the factors that influence it.

Measurements of height and weight usually are recorded on pupils' cumulative health records, although some schools prefer to keep separate growth charts. Among the latter are those prepared by Howard V. Meredith, Ph.D., for the Joint Committee on Health Problems in Education.* Separate forms for boys and girls ages 4 to 18 indicate normal zones for the tall, moderately tall, average, moderately short and short. Weight is similarly divided into five corresponding zones.

Different techniques for recording growth have been developed by other authors. A decision to use any of these growth charts should result from a careful study of the contributions they can make to the total school program. In the upper grades and in secondary schools, pupils can maintain their own growth records under teacher supervision.

OTHER SCREENING PROCEDURES

Additional procedures for evaluation of pupil health and determination of need for referral are frequently used, especially in larger schools with well-established programs adequately staffed. Some of these procedures are more extensive than is implied by the word "test," and some may be placed administratively in school departments other than school health services. Nevertheless, as a contribution to the appraisal of a whole person, they should be considered by health service personnel.

Physical performance tests are procedures that measure motor skill, muscle strength, endurance, and other related factors as a part of evaluation and classification for physical education activities, including athletics. Batteries of tests bear the name of the person or organization designing the specific test. They vary considerably in content and intent, so should be selected for a specific purpose. Such tests are recognized as having value for these purposes as well as having a place in overall pupil appraisal.

There is little agreement as to how well such tests measure "physical fitness." Those who interpret "physical performance tests" must be aware of their limitation and avoid attaching undue significance to any particular test. It is unfortunate to label an otherwise apparently normal child as physically unfit merely because he fails in an arbitrary performance test that may have little relationship to a total concept of fitness. Physical performance is only one part of total fitness, which in its broad sense includes mental, emotional, and social, as well as physical facets. Physical fitness is an individual type of thing and should be evaluated in terms of individual potential as well as group norms.

Psychological, personality and intelligence evaluation by a variety of procedures is usually administered by such school personnel as psychologists, social workers, counselors and occasionally by teachers. Since these people are infrequently found in the health service office, every effort should be made to obtain the records involved so that they may be correlated with the findings from screening procedures during the physician's evaluation.

Serious emotional problems present symptoms which cannot be ignored by the school and should be identified early. Symptoms such as truancy, lethargy, failure to attempt assignments, aggressive or provocative behavior toward teacher or school authorities, behavior dangerous to other children or to himself, theft, cruelty, promiscuity, legal delinquency or persistent failure to learn in spite of evidence of adequate ability may be difficult to understand but certainly are easy to recognize.

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* National Education Association and American Medical Association, Joint Committee on Health Problems in Education. *Physical Growth Record* (for Boys and for Girls). Washington, D. C. and Chicago: the Associations. 1963.

See Appendix III, pages 31 and 33, for illustrations of the Physical Growth Records.

Only a few schools have adopted formal screening programs for the early identification of emotional problems. Available instruments for screening children who are potentially vulnerable to maladjustment are newer than those used for other kinds of health problems and have been less well validated. Useful rating scales which teachers can check are now available for specific age groups. Inservice training and preservice training in recognizing symptoms justifying referral of a pupil to members of the health team in the school, to community agencies or to the medical profession is available to teachers. The fear of false identification may be dissipated if results of screening for emotional difficulties are treated as strictly confidential material for professional use only.

Certain indications of emotional problems are readily observable by teachers. When any important observations are noted on pupils' cumulative records, the descriptions should be precise in terms of data directly observable by the teacher. Specific objective behaviors rather than subjective descriptions based on opinion are noted. The teacher does not make a diagnosis.

Unusual or special health problems in a community may warrant a screening procedure which, under ordinary circumstances, might not be justified. When such tests are needed to protect child health, a decision to add a specific screening device to the school program as either a temporary or established practice should follow discussion of its need and value by school, medical and public health personnel. The discussion should consider the incidence in the local community of the problem which the test will screen, the cost of the test in terms of case-finding potential, the hazard of the condition involved to the child population, and the suitability of the procedures for use in the schools. For example, mass examination of specimens of blood, urine and feces is rarely warranted in a school health program. However, under certain circumstances, examination of a school population by laboratory procedures may be a necessary facet in the epidemiology and control of endemic or epidemic disease.

It is unwise to introduce new procedures into the school health program without general acceptance by the parents involved and approval by the local medical, public health, and educational authorities.

NURSE-TEACHER CONFERENCE

No program to appraise pupil health can be fully effective without skillful teacher observations. Conference between the classroom teacher and the nurse serving the school provides opportunity for the nurse to review the teacher's observations and make more significant referrals. The observations and knowledge of each, when viewed together, may make each more meaningful. Together they decide if the condition warrants parent attention. The nurse may suggest that the pupil be seen by the school medical advisor, if one is available, or may initiate referral of the child, through his parents, for professional care.

In some schools nurse-teacher conferences are scheduled regularly throughout the year as a means of increasing teacher understanding of health conditions and of developing teamwork in school health activities.

Teacher observations are particularly helpful in detecting (a) the onset of a communicable disease, (b) numerous conditions, the beginning signs of which are not easily detected by medical examination, and (c) conditions which may have developed since the last medical examination. Neither the teacher nor the nurse ever makes a medical diagnosis, but it is important that their significant observations be made known to the parents, and through the parents to the pupil's physician.

PHYSICIAN'S EVALUATION

The final step in an ideal health appraisal is a review by the physician of such information as may have been recorded by teacher, nurse, psychologist, counselor or others in the cumulative health record; a review of the pupil's health history with the development of additional information by skilled questioning of the child and his parents, alone or together; a medical examination; and finally an evaluation by the physician of the degree of wellness, and any needed special consideration or corrections.

Health Histories

Health histories include a recording of past episodes related to health usually provided by the parent or pupil on prepared forms or check sheets, or by answers to the physician's questions at the time of examination.

Health histories provide information that cannot be obtained, or at least is not easily obtained, by other appraisal procedures. Teacher observations, usual school screening tests, and medical examination may not always reveal pupils who have had any of several serious conditions but may seem perfectly well at the time of a medical examination. Such problems may be identified through a health history or a separate "developmental form."

Health history data should be recorded on a pupil's health record so that it need not be taken again each time the child is to have a medical examination. Also, it is available to the physician during the subsequent examinations.

Medical Examinations

In urban communities a director of school health services employed by the schools or by the health department may provide leadership in planning a program of medical examinations, while in small towns or rural communities leadership may come from a committee representing the schools, the medical society, the health department and other groups concerned with health service and health education in the school. Formulation of a medical examination program requires answers to many questions, including: (a) Who should examine pupils? (b) How frequently should pupils be required or encouraged to obtain medical examinations? (c) Where should examinations be conducted? and (d) How extensive should the examination be?

Who Should Examine Pupils?

Ideally, every child should have periodic examinations from birth through the preschool and school years. Unfortunately, such care is not provided by all parents. Medical examination procedures, therefore, should be developed with due consideration to legal requirements and to the educational and health factors involved.

Examination of pupils by their own physician in the physician's office is becoming increasingly common and has both medical and educational advantages. A pupil and his parents may ask the physician for needed information or advice. If a health problem exists, the physician can discuss it and without delay perform any therapy that his examination suggests. With the parent present, the needed authorization is immediately available. Privacy is assured. The physician has on hand in his office the needed equipment and facilities for special tests and for treatment, as well as records of previous examinations and treatment, including immunizations. Educationally, examination in the private physician's office permits the pupil to appreciate the conditions under which one calls on a physician and to become accustomed to seeking medical advice from his physician. Examinations made in this manner encourage desirable pupil-physician relationships and have a real potential for carry-over

of the practice into post-school life. They are educational experiences of great value.

Referral of pupils to their own physicians for periodic examinations must be done through the parents in a manner that avoids embarrassment of those who cannot or do not follow this procedure. Home visits by school nurses or social workers may help families to understand the need for occasional medical examination.

Experience shows that the number of pupils going to their family physician for examination can be increased through educational efforts. Such efforts should begin with the parents of children entering school. Nurses and other school health personnel should emphasize the value of periodic medical examinations and the willingness of the school to receive suggestions from private practitioners regarding desirable modification of a pupil's school program because of health conditions.

The trend toward having pupils obtain medical examinations from their own physicians necessitates formulation of procedures for the transmission of information from the school to the physician, as well as for the physician to transmit information needed by the schools, including suggestions concerning the pupil's ability to participate in regular school activities. Exchange of information is facilitated when the school or school system provides a form worked out by the medical society and the school, on which the physician may record the results of his examination as well as his recommendations.

A program needs to be developed also to provide periodic medical examinations for pupils who are not examined by their own physician. The most frequent practice is the employment of a physician by the schools or the assignment to the schools of a physician employed by the health department. The service of a number of physicians may be needed.

At times needy children are referred to a welfare or health department clinic or the outpatient department of a local hospital in lieu of a personal physician.

Frequency of Medical Examinations

The frequency of medical examinations of school children is determined by law in some states, and by the local community in others. Where there are no legal requirements, the frequency of medical examinations should be determined cooperatively by representatives of parents, local physicians, public health officials and school health personnel.

An optimum of approximately four examinations during the school life of a child and additional examinations whenever referral is suggested by the school nurse or school physician has been recommended repeatedly by the Joint Committee on Health Problems in Education of the NEA and AMA and by the several National Conferences on Physicians and Schools of the AMA. Those who establish the number for any school will be guided by consideration of (a) available medical manpower, (b) the health needs of children and youth, (c) anticipated outcomes in relation to money expended, and (d) community customs and mores.

Numerous professional groups have had a hand in setting these "previously determined frequencies," including the National Committee on School Health Policies and the American Academy of Pediatrics.* The former, composed of representatives of numerous national professional groups, stated its views in these words:

* American Academy of Pediatrics, Committee on School Health. *Report of the Committee on School Health of the American Academy of Pediatrics*, Evanston, Ill.: the Academy, 1966.

"During their school years, pupils should have a minimum of four periodic medical examinations: at the time of entrance to school, and at approximately the fourth, seventh and tenth grades. Additional examinations should be made whenever observations indicate. . . .

"Although some support the view that annual examinations are not justified, some states require them by law, and most states require them for sports participation. Fewer examinations of good quality coupled with time for instruction and counsel are usually considered preferable to frequent complete coverage of the school resulting in inadequate examinations that are medically and educationally unsound.

"Medical examinations, in addition to providing the information to guide school personnel in the proper counseling of the pupil, should be sufficiently personalized to provide a desirable educational experience for the student.

"The seasonal pressure of many examinations at or near the fall opening of school can be relieved where schools and physicians are able to agree on a system of priority scheduling. Athletic teams need early attention; however, first priority should always include referral examinations for clarification of suspected health problems. Periodic medical examinations can be distributed through the school year to use available physician time effectively. Again it should be stressed that health appraisal is of value only as it leads to remedial care."*

The extent of the examination will depend in part on the items in the health history needing exploration, and on whether the examiner is the child's personal physician who knows him well or a stranger without previous contact. In either case children and youth cannot be examined properly when dressed. All areas of the body should be exposed to the examiner, although not all at the same time. For older girls a slipover or other chest covering should be provided, and for both boys and girls the genitalia should be covered except during examination. Protection for the feet should be provided when the shoes and stockings are removed.

School and health department personnel should realize that children and youth may be asked to obtain medical examinations for a variety of purposes such as those required by the school, an examination previous to going to camp or to participation in scouting activities, out-of-school athletic competition, or swimming at the YMCA, YWCA or other youth agencies. Examinations for work permit certificates are required in most schools. Efforts have been made to coordinate medical examination requirements so that a single examination would be acceptable to all agency programs except where a significant illness or injury occurs. This practice could conserve the time, money and energy of all concerned.

Referral Procedures for Medical Examinations

Since children may develop health problems between periodic examinations, effective referral procedures to assure health evaluation when the need is suspected are essential. Teacher or nurse observations of changed appearance or behavior, or an intercurrent illness or injury that is obvious, suggest referral of the child to his personal physician for such diagnosis and treatment as may be necessary. Since the child's parents have primary responsibility for the health of the child, such referrals proceed through the parent. The only exception is in an emergency, when the school must act immediately but according to the parent's wishes as previously indicated on the school health record. In

* National Committee on School Health Policies. *Suggested School Health Policies.* Fourth Edition, Washington, D. C. and Chicago: National Education Association and American Medical Association, 1966 p. 15.

many cases it may be necessary for a child to see the dentist, surgeon, orthopedist, cardiologist, psychiatrist or other specialist. Such services should be procured through arrangements made by the family and its own physician.

Medical Examination of the Athlete

Persons subjected to strenuous activity, such as athletes and cheerleaders, frequently require special examinations. The pre-participation medical examination is a primary consideration for their welfare.

The aims of these examinations are to:

- determine the health status of candidates prior to competition;
- arrange for further evaluation and prompt treatment of remediable conditions;
- counsel the atypical candidate as to those sports which for him would provide suitable activity; and
- restrict from participation those whose physical limitations present undue risk.

One annual health examination should suffice except when the candidate 1) has experienced a significant injury or illness since the last evaluation, or 2) the candidate has been encouraged after successful surgery and/or therapy to seek reevaluation.*

DENTAL EXAMINATION**

School Dental Health Program

A school dental health program aims to help children and youth appreciate the importance of a clean mouth, free of disease and abnormalities, and to help them assume responsibility for personal care and for securing periodic professional care. The school's role in achieving these objectives involves instruction and counseling.

The extent to which education relating to dental health is supplemented by specific services within the school varies widely depending in part on the role played by other community agencies. The program for a particular community should be formulated jointly by representatives of parents, school personnel, the health department and the local dental society. Attention needs to be given to dental health attitudes, to the advantages and disadvantages of school dental inspections, to types of dental examinations and to adequacy of treatment facilities.

Schools should encourage parents to take children to their own dentists for examination and for treatment if needed. This is done through notes or letters to parents, or through the use of printed cards or forms. The form used need not be complicated and can be devised by school officials and representatives of the dental society. Following classroom discussion of the need for periodic dental examination, the teacher gives a printed card or form to each pupil. Instructions are given: (a) to take the form home, (b) to discuss it with parents, (c) to arrange for dental examination and treatment if needed, and (d) to return the signed form to the teacher. The plan is effective, inexpensive and suitable for all types of schools, and provides for excellent integration with the health education program. It is most effective when the community facilities are such that a mother who cannot take her child to a private dentist can take him to a clinic. There is complete agreement on the value of teachers encouraging pupils to go to their dentists for regular examination.

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* "A Guide for Medical Evaluation of Candidates for School Sports," Committee on the Medical Aspects of Sports, American Medical Association, Chicago, 1966.

** Adapted from SCHOOL HEALTH SERVICES, the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association. Washington, D. C.: the Associations, 1953, Second Edition, 1964.

Excusing Children from School

Since one of the aims of the school health program is to help children establish the habit of making periodic visits to the dentist, it is now common practice to excuse pupils from school to keep dental appointments. The justification of such practice, however, is not based solely on educational consideration. In most communities, dentists cannot care for all school children after school and during vacations. As a general rule, young children should visit the dentist in the early part of the day when they and the dentist are less likely to be affected by nervous and physical fatigue. Dentists, on the other hand, should keep school-day scheduling to a minimum and try to schedule a child at different hours for each visit so that prolonged care does not cause a child to miss a large number of periods from the same class. Education is expensive, and regular attendance at school is important to satisfactory achievement.

Dental Health Inspection in Schools

A sharp division of opinion exists as to the desirability and effectiveness of dental inspections in schools. The chief argument made by proponents is that the dental health inspection provides a fine educational experience and the best possible encouragement to visiting a private dental practitioner for needed care. Those who oppose the practice feel that inspection is a waste of time, since all children need care semi-annually or oftener, and that the time and effort spent in inspection might better be used in encouraging periodic visits to the personal dentist.

These various aspects of the problem need to be considered carefully by representatives of the several local groups concerned with dental health before a definite program is developed. It should be remembered that a basic criterion for evaluating medical and dental examinations done in the school is whether they provide a high quality educational experience. If they fail in this respect, they cannot be justified as a school activity or responsibility.

Types of Dental Examinations

If dental examinations or inspections are conducted, it is important to select carefully the procedure to be used and to note this in reporting results. Unless this is done, it is impossible to evaluate the conditions found or to compare results with those obtained in other communities.

To encourage standardized procedures and uniform reporting, the American Dental Association adopted, for use by the dentists and other professional personnel, the following classification of types of dental examinations and inspections.*

Type 1. *Complete examination,* using mouth mirror and explorer, adequate illumination, thorough roentgenographic survey; when indicated, percussion, pulp vitality tests, transillumination, study models, and laboratory tests.

Type 2. *Limited examination,* using mouth mirror and explorer, adequate illumination, posterior bitewing roentgenograms; when indicated, periapical roentgenograms.

Type 3. *Inspection,* using mouth mirror and explorer, adequate illumination.

Type 4. *Screening,* using tongue depressor, available illumination.

The value of a dentist's service will depend on which of these four types is used.

* American Dental Association. *A Dental Health Program for Schools.* Chicago 1967: the Association.

Use of the Dental Hygienist

A school that includes dental inspection in its program may use a hygienist to inspect pupils' teeth, to demonstrate dental principles and to serve as a resource person for the classroom teacher. Although she may record the findings of her inspection, this is primarily for educational purposes. It is not within the province of the dental hygienist to make a complete dental examination or diagnosis. When the school records reveal that a child is not receiving needed dental treatment, the hygienist informs the parent through a conference at school, a visit to the home, or a note, letter or telephone call.

A hygienist may be assigned other responsibilities. In some schools she cleans children's teeth (dental prophylaxis). Such activities, like dental inspections, are provided as demonstrations with significant educational value rather than as substitutes for care by a dentist. Some states also permit the hygienist to make topical applications of a fluoride solution to the teeth of children as a decay preventive measure.

OTHER CONSIDERATIONS RELATING TO HEALTH APPRAISAL

Parents who accompany children receiving medical examinations should be assured an informative and satisfying experience whether the examination is performed in the physician's office or elsewhere. During the waiting period, which should be as short as possible, they should have a comfortable place to sit, read and talk. Attractive posters should decorate the room and interesting reading material should be at hand, including pamphlets on a variety of health topics, magazines like TODAY'S HEALTH, and other educational and health material. Parents and children should be identified by name and introduced to all persons involved in the examination procedures.

The Emotional Climate at the Examination

The personalities present and the procedures used influence the emotional climate of the examination and thus affect the receptiveness to suggestions and recommendations. Friendliness and interest in the health of a pupil must be evidenced by word and by action. Personalities must be respected and individual opinions given consideration. Questions should be answered accurately and as completely as possible in words appropriate to the particular child or parent.

Suggestions to parents and pupils should be both frank and constructive. The pupil's health assets should be pointed out before centering attention on problems. In interpreting a health condition the nature of the difficulty should be described and what can be done about it explained. It is particularly important to help the pupil or parent to map out a course of action.

APPENDIX I
VISION SCREENING PROCEDURES

SNELLEN TEST

Preparation for Administering the Snellen Test

Select an area 20 feet long where the Snellen test chart can be hung at one end and the child can sit or stand at the other end with his eyes above the 20-foot mark and level with the chart. Illumination intensity on the chart will be 10- to 30-foot candles evenly distributed without glare and almost entirely supplied by artificial sources. These sources must be so shaded that they illuminate the chart but do not shine into the child's face. No source of light in the line of vision of the child should be as bright as the chart. It is advantageous to have general illumination in the room not less than 1/5 the illumination on the test chart.

The Snellen chart, both letters and symbol E, must meet standard specifications concerning the size and spacing of letters. This may be assured by purchasing charts from reliable sources.*

The Testing Procedure

For valid results children must be at ease and encouraged to do the best they can. Their eyes should be at the same level as the chart. Children being tested for the first time with the E chart need to be taught how to indicate the direction of the shafts of this symbol in its different positions.

Both eyes should be open during the test. The eye not being tested is covered with a small card or folded paper resting obliquely across the nose. For reasons of sanitation and aesthetics each child should have his own individual card or paper. The tester should be sure that the card obstructs the vision of the covered eye and that the child does not "peek" and thus invalidate the test where there is a difference in the visual acuity of his two eyes.

A standardized routine avoids confusion and facilitates recording. The following procedures are recommended:

a) If a child wears glasses, test him with his glasses first, then without.
b) Test the right eye first, then the left, and then both eyes together.
c) Begin with the 30-foot line and follow with the 20-foot line. Some testers prefer to begin with the 40-foot line. It is not necessary to test beyond the 20-foot line. If the child is suspected of having low vision, or if he fails the 30-foot line, start with the 20-foot line.
d) Keep unused parts of the chart covered, using cards with cutouts to expose single letters. This improves concentration and prevents memorization.
e) Move promptly and rhythmically from one symbol to another at a speed with which the child can keep pace.
f) Consider that a child sees a line satisfactorily if he reads correctly three out of four symbols.
g) Record results immediately in fraction form, the numerator representing distance from the chart (20 feet), and the denominator representing the lowest line read satisfactorily.

* Equipment may be obtained from the National Society for the Prevention of Blindness, 79 Madison Avenue, New York 10016. A Snellen chart with built-in illumination may be obtained from Good Lite Company, 7426 Madison Street, Forest Park, Illinois 60130.

While testing, note if the child strains to see. Evidence of this includes tilting the head, leaning forward in his chair, watering of the eyes, excessive blinking, thrusting the head forward, frowning, scowling, squinting, closing one or both eyes or trying to look around the card covering one eye. Observation of such activities should be recorded.

Annual testing during the first few years of school, with retesting of those in whom there has been a previous suggestion of deviation, is particularly important. If it becomes necessary to limit the amount of vision screening carried on, it may be performed less frequently in the upper grades. Also, children who wear glasses need not be tested when they are definitely known to be under an eye physician's continuing supervision.

OTHER VISION TESTS

Test for Accommodative Ability

Screening for farsightedness (which may produce ocular discomfort without impairing acuity) sometimes is accomplished through use of suitable convex lenses* in a testing frame. This also determines the pupil's ability to accommodate for close work. A pupil is asked to read the 20-foot line of a Snellen chart with both eyes open and uncovered while wearing convex lenses (+2.25 diopter strength for the first three grades, +1.75 for the fourth grade and above). If he *can* do this, he *fails* the test, for with the lens in front of his eye he should not be able to see the 20-foot line clearly. The test is done only on those who pass the Snellen test for acuity of vision. Since this is a screening test, failure means that a child needs a complete eye examination and not that he necessarily requires glasses.

A visual acuity near-point test with cards held 14 to 16 inches from the eyes is sometimes urged in school screening procedures because so much reading is required in school. Most authorities agree that the plus lens test for distance is a more reliable indication of the pupil's ability to accommodate for near-vision tasks.

Tests for Binocular Coordination

There is no satisfactory screening procedure for impaired binocular coordination, which is dependent not on the amount of muscle imbalance alone but on other factors which are identified at clinical examination but are not subject to screening techniques. Near-vision tests of muscle balance represent the end result of many factors, making clinical interpretation necessary, so that near-vision muscle balance tests are unsuitable for screening.

Even in distance vision, screening by degree of "muscle imbalance" will yield many false positives who have no abnormal condition, and pass as negative an appreciable percentage of those who actually have impairment of binocular vision.

Vertical heterophoria (tendency of the eyes not to remain on the same level), on the other hand, is abnormal, and the screening tests for it reliable; but the condition is not common. With respect to *lateral* heterophoria, however, the tests do not clearly differentiate between significant eye problems and physiological variables that do not require treatment. Hence the value of all subjective "muscle balance" tests in screening is limited. They should never be used on children who have failed other tests or who have been observed to have signs or symptoms. All these children have been identified as in need of professional eye examinations and therefore do not require further screening.

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* Convex sphere test lenses are available through local opticians or from Good Lite Company, 7426 Madison Street, Forest Park, Illinois 60130.

As a matter of fact, children with disturbance of binocular vision have such a high frequency of reduced visual acuity, hyperopia, and eye signs or symptoms that the application of these criteria alone is a useful means of screening for impaired binocular coordination.

Stereoscopic Screening Devices

Stereoscopic devices for eye screening purposes are available.* All employ test targets viewed through a binocular device designed to test central visual acuity, muscle balance and color vision; some devices include a convex lens test. A number of these instruments are furnished with tests of other components of binocular vision.

Opinions vary as to the value of these instruments in schools. Some eye physicians consider their use for screening acceptable provided the tests selected for use are only those based on the physiological principles of the central acuity (Snellen) test, the convex lens test, and (subject to the limitations previously noted for them) the distant muscle imbalance tests. Decisions concerning their use must include consideration of cost and the possibility that they may not clearly differentiate between significant eye problems and minor deviations and physiological variables that do not require treatment. In any case, a local committee of people who have expert knowledge should exercise discretion in the selection of tests and establishment of standards regardless of what tests are offered by the manufacturer.

Testing Ability to Identify Colors

Since normal color vision is needed in certain occupations, it is desirable to test pupils' ability to distinguish colors before entrance to the junior high school grades, a time when vocational choices frequently are considered. Such tests should be given as early as possible and certainly by the sixth or seventh grade.

Two color vision tests satisfactory for school use are the Hardy-Rand-Rittler Test (American Optical Company, Southbridge, Massachusetts) and the Ishihara Test (Takamine Overseas Corporation, 10 East 40th Street, New York, N. Y.). Color tests need to be given with natural daylight illumination, but not direct sunlight. Directions accompanying test materials should be followed carefully; otherwise the results are not reliable. Such tests do not need to be repeated because the ability to identify colors does not change.

APPENDIX II
HEARING SCREENING PROCEDURES

Testing Environment**

A good acoustic environment is necessary. If the examiner is testing at 10 db or 15 db above audiometric zero while the environment induces 20 db

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* Stereoscopic school screening instruments are available as follows: "School Vision Tester" from Titmus Optical Company, Petersburg, Virginia: "School Vision Test" from Bausch and Lomb Optical Company, Rochester, New York; and "Telebinocular School Vision Test" from Keystone View Company, Meadville, Pennsylvania.

** This appendix has been adapted from portions of Monograph supplement #9, *Journal of Speech and Hearing Disorders*, September 1961, Edited by T. L. Dailey, Ph.D. for the Committee on Identification Audiometry of the American Speech and Hearing Association.

of masking, spuriously large numbers of subjects will be referred to successive stages of the identification program. Initial expenditure for a suitable testing environment results in substantial savings of money spent for the referral of children erroneously thought to have hearing impairment.

Regardless of the type of test used, the testing environment must be one in which valid measurement can be obtained. The testing area should be located as far as possible from the noise of building service areas, student traffic and regular scheduled activities expected to induce sound levels high enough to mask test sounds. A standard sound-treated booth made by a commercial manufacturer which can guarantee at least 40 db attenuation is recommended.

Choice and Care of Equipment

The audiometer to be used in identification audiometry should meet the specifications established by the American Standards Association for this purpose. Current specifications may be learned from the U. S. Bureau of Standards or the American Speech and Hearing Society, both in Washington, D. C.

Audiometers should be returned to the factory or designated center for calibration check, recalibration and repair after every four months of use, and certainly no less frequently than once each calendar year. Because of the transition from the American Standard (1951) of calibration to the International Organization for Standardization Standards (1964), audiologists and others must know the calibration of their audiometers. The 1951 American Standard levels are higher by about 10 db on the average and the shape of the 1951 threshold contour differs from that of the ISO. However, audiograms recorded by either calibration can be translated into the other.

Frequencies to be Tested

It is recommended that no less than four, preferably five, frequencies be tested. The frequencies recommended for identification audiometry at the school-age level are 500, 1000, 2000, 4000 and 6000 cps.

No valid data exist supporting the use of a sweep check hearing test at all frequencies; nor are there adequate data available yet to support limited frequency audiometry using only one or two frequencies. In programs of preventive medicine, however, if one strips his data gathering to the minimum, he will fail to answer all of the questions about hearing loss. The procedure of choice, then, is to test more frequencies rather than fewer frequencies until such time as definitive data are available justifying the use of only one or two frequencies.

Screening with a Sweep Test

It is recommended that screening be done at the 10 db level, with reference to the present American Standard Audiometric zero for the frequencies of 1000, 2000 and 6000 cps, and at the 20 db level for the frequency of 4000 cps. Because the tester can "sweep" through all of the frequencies in rapid order, this test is often called a sweep test. It is necessary for the tester to check the pupil's responses both for detecting the presence of the tone and for detecting when it is turned off by using the interrupter. Even so, a screening test can usually be performed on both ears in about two minutes.

The purpose of the screening test is to identify individuals whose hearing at one or more frequencies is outside the range of normal. A child would be judged to have failed the screening test and be a candidate for referral for the threshold test if he failed to hear the 10 db level at either 1000, 2000 or 6000 cps, or the 20 db level at 4000 cps in either ear. In most school hearing surveys, between 5 and 10 percent of the enrollment will fail to pass the screening test.

If more than 10 percent fail, the tester should re-examine his technique, check the accuracy of calibration of the audiometer, or evaluate the possible effect of environmental noise on his test results.

Technique for Threshold Testing

Pupils who fail to respond to one or more frequencies in either ear in the screening test should have their thresholds at each of the test frequencies charted on an audiogram. This test is designed to identify children to be referred to an otologist for diagnostic examination. If there is any difference in acuity between the ears, the better ear should be tested first. It is advisable to commence the test at the frequency of 1000 cps, since research has demonstrated that the test-retest reliability of 1000 cps is greater than at any other frequency. The pupil is instructed to raise his finger, to push a button that operates a signal light on the dial of the audiometer, or to say "yes" when he hears a tone, and to lower the finger, release the button, or say "no" when he realizes the tone is not audible. The tester searches for the minimum intensity level at which the individual responds correctly to the presence of the tone at least 50 percent of the time, when threshold is approached from inaudibility—that is, by an ascending technique. Several trials will be required before the tester is satisfied that the pupil is responding consistently. When threshold has been determined at 1000 cps, the frequency selector is moved to other frequencies and the same process of threshold determination described for 1000 cps is followed.

After all frequencies have been measured, a repeat threshold measurement is made at 1000 cps. The purpose of the second threshold measurement at 1000 cps is to check on the reliability or consistency of the pupil's responses. If the second threshold at 1000 cps is not within plus or minus 5 db of the first one, then the tester knows that the boy or girl being tested is not responding consistently, and the validity of the audiogram being obtained is suspect.

After the audiogram for the first ear has been charted, the tone is switched to the other ear, and the same procedure is followed in obtaining the threshold measurements at all of the test frequencies. It is possible that the tester will note differences in acuity between the two ears of 40 or more db at some or all frequencies. If such differences are noted, then the tester should be aware of the possibility that the pupil may be responding to the tone in his better ear, even though it is being presented only to the other ear.

Current criteria for referral specify failure at two of the frequencies tested at a sensation level of 20 db or failure of one frequency tested at a level of 30 db.

Hearing Impairments Which Are Medically Significant

There is no definite point at which a deviation from "normal" hearing should cause concern, but by agreement a loss in either ear of 20 db or more at two or more frequencies or a loss of 30 db or more at any single frequency is considered to be "medically significant." A child with a medically significant loss should have a medical examination of his ears to determine whether or not any medical or surgical care is indicated.

Many children will have "medically significant" hearing losses according to the above standards on the basis of a loss *only* at 4000 cps. In such cases, a medical examination will rarely reveal any condition that is amenable to treatment. Some physicians prefer to consider that a loss at *only* 4000 cps does not constitute a medically significant loss.

APPENDIX III
PHYSICAL GROWTH RECORDS FOR BOYS AND GIRLS

HEIGHT WEIGHT INTERPRETATION FOLDER FOR BOYS*

Uses of folder. This folder (1) provides each boy a personal chart designed to accompany him from grade to grade and give a graphic record of his growth in height and weight, (2) furnishes the teacher a guide for interpreting each pupil's height and weight records as indicators of growth status and growth progress, and (3) brings the attention of school health workers to certain height and weight findings suggestive of deviations from satisfactory health.

Determining weight. Obtain the weight of each pupil in September, January and May. Wherever possible use beam-type, platform scales. Before each weighing period check the scales; if they do not balance correctly, adjust them. Have the boy remove his shoes and as much other clothing as practicable (the weight measures used in developing the chart were taken on boys wearing underclothing only). With the boy standing near the center of the platform of the scales, his hands hanging free, determine weight to the nearest one-half pound.

Determining height. Use a metric measure fixed in the upright position, and a wood headpiece. The measure may be a yardstick, metal tape or paper scale; it should be fastened firmly to an upright board or to a smooth wall with no wainscoting. (An accurate paper scale may be purchased from the Institute of Child Behavior and Development, State University of Iowa.) Although a chalk box can serve as the headpiece, this is not recommended for regular use. A more satisfactory headpiece is easily made in the school workshop by joining at right angles the shorter edges of two pieces of seasoned wood 7 inches x 5 inches, and mounting within the 90° angle a triangular wood brace having an opening for insertion of the fingers.

Measure height with shoes removed. Have the boy stand with heels, buttocks and upper part of back in contact with the wall or board; feet almost together but not touching each other; arms hanging at the sides; heels in firm contact with the floor; head facing straight forward; and chin lifted but not tilted up. When he is positioned, place one face of the headpiece against the upright scale and bring the other face down, keeping it horizontal, until it crushes the boy's hair and makes contact with the top of his head. Take two separate measurements and record height to the nearest one-fourth inch.

Registering height and weight status. Assume you have determined the height and weight of Ned Barth. Ned weighs 50 pounds, is 45 inches in height, and will have his fifth birthday tomorrow. Find age 5 below the *height* portion of the chart and 45 inches along its left-hand margin. Plot a point above 5 years and opposite 45 inches. Below this dot on the height portion of the chart write "45.0."

Next, find age 5 years below the *weight* portion of the chart and 50 pounds along its left-hand margin. Plot a point above 5 years and opposite 50 pounds. Above this mark in the weight portion of the chart write "50.0."

With the completion of these directions, the height and weight status of Ned Barth at age 5 years is fully registered. At any age from 4 years to 18 years, the status of other boys can be registered similarly.

Registering height and weight progress. Assume Ned is now one year older. At age 5 years 4 months he weighed 52 pounds and had a height of 46 inches, at age 5 years 8 months he weighed 55 pounds and was 46.5 inches tall, and now at age 6 years he weighs 58 pounds and is 47.5 inches in height. Further, assume that points representing these records have been plotted correctly on Ned's chart. Having status records at more than one age, it becomes possible to draw *individual growth curves*, or lines of progress. Ned's progress between ages 5 years and 6 years can be depicted by drawing lines connecting (a) his points in the height part of the chart and (b) his points in the weight part of the chart.

Following the same procedure, height and weight progress of any individual boy may be portrayed over part or all of the period from age 4 years to age 18 years.

Interpreting status. (1) The figures written above or below the plotted points readily describe each boy's overall body size at the age or ages measures have been obtained.

(2) The channels in which a boy's height and weight points for a given age are located indicate his standings with reference to schoolmates of like age. The illustrative values given at age 6 years show Ned to be moderately tall and moderately heavy.

(3) When a boy's height and weight points do not lie in corresponding channels, the discrepancy may denote normal slenderness or stockiness of build, or it may reflect an undesirable state of health. Assume the chart shows a new pupil to be "average" in height and "light" in weight. He should be screened for medical study to determine whether he is a "satisfactorily healthy" boy of slender build, or a "medically unsatisfactory" boy with an incipient infection, a nutritional deficiency or an unsuitable activity program.

Interpreting progress. (1) The difference between a boy's recorded heights (or weights) at two different ages gives the amount of change in the intervening period. For example, Ned Barth between 5 and 6 years of age gained 2.5 inches in height and 8 pounds in weight.

(2) During the childhood span from age 4 years to age 11 years normality of growth progress is indicated by approximately parallel relationship of the individual's height and weight lines with the channel lines of the chart. Suppose that Paul Stone has been measured successively from age 6 years to age 10 years. His height line runs along the middle of the "average" height channel, while his weight line runs fairly close to the middle of the average weight channel until age 9 years then takes a steep turn upward. Paul should be screened for medical investigation—his disproportionate gain in weight may reflect the need for a prescribed diet, a change in daily regimen, or drug therapy.

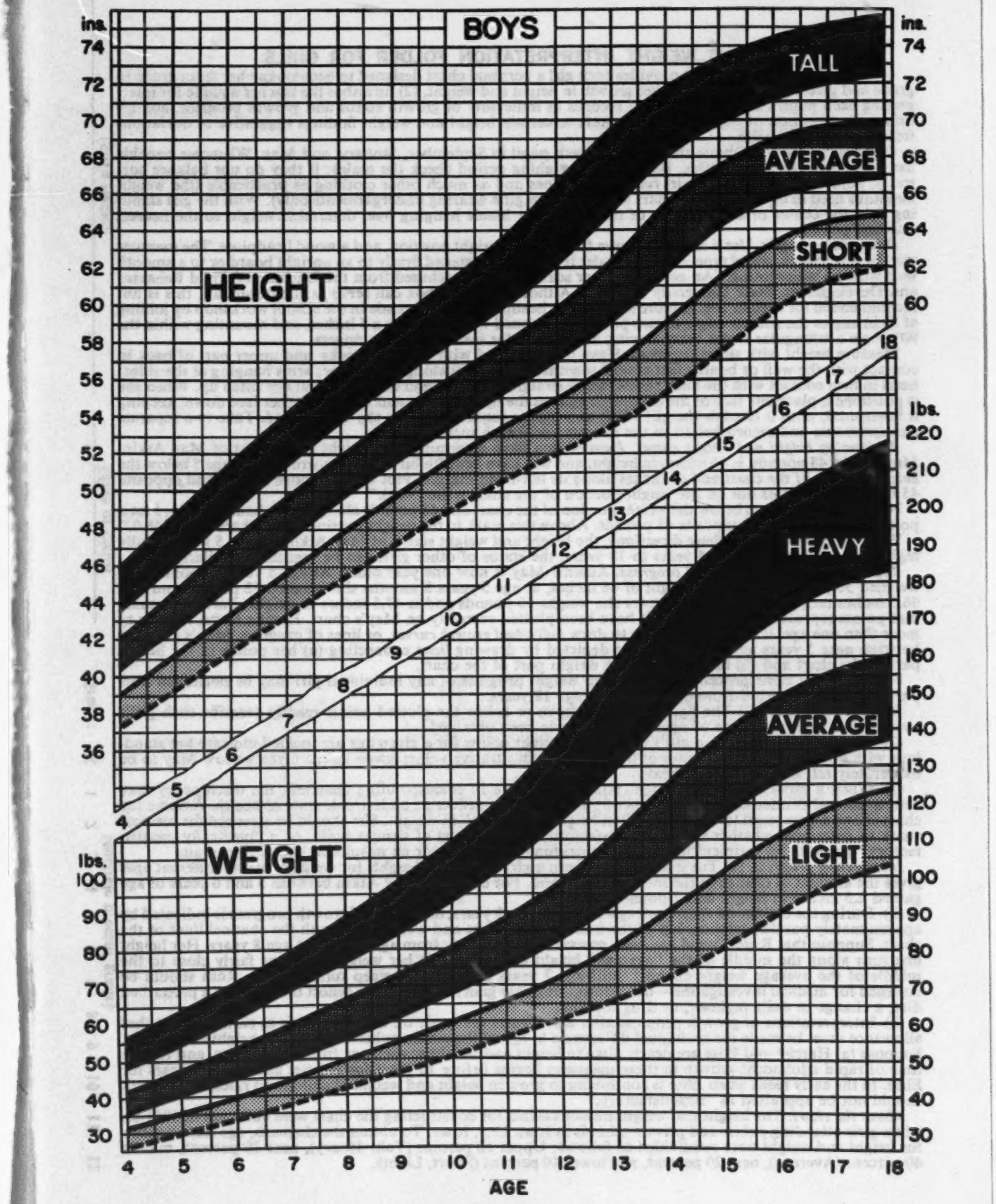
(3) Interpretations of growth progress after age 11 years are made on the same basis as earlier except that allowance must be made for individual differences in age of the circumpuberal "spurt" in height and weight. Suppose (a) Eric and Gerald are nearly alike in height and weight at each age from 5 to 11 years, and (b) the time of rapid adolescent growth in these measures begins before 13 years for Eric and after 15 years for Gerald. In the early teens when Gerald is continuing to grow in height and weight at childhood rates, this growth should not be appraised as "unsatisfactory."

About the chart. The height and weight measurements for constructing the chart were collected in 1961-1963 on white boys attending public and private schools in Iowa City, Iowa. To obtain the channels, age distributions for height and weight were subdivided as follows: Upper 10 percent (Tall, Heavy), next 20 percent, middle 40 percent (Average), next 20 percent, and lower 10 percent (Short, Light).

(boy's name) _____ (date of birth) _____

Grade: K 1 2 3 4 5 6 7 8 9 10 11 12 (encircle present grade)

*Prepared for the Joint Committee on Health Problems in Education of the NEA and AMA by Howard V. Meredith and Virginia B. Knott, State University of Iowa. Additional copies may be secured through the order departments of the American Medical Association, 535 N. Dearborn St., Chicago, Illinois 60610, or of the National Education Association, 1201 Sixteenth St., N. W., Washington, D. C. 20036.


BOYS
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HEIGHT WEIGHT INTERPRETATION FOLDER FOR GIRLS

Uses of folder. This folder (1) provides each girl a personal chart designed to accompany her from grade to grade and give a graphic record of her growth in height and weight, (2) furnishes the teacher a guide for interpreting each pupil's height and weight records as indicators of growth status and growth progress, and (3) brings the attention of school health workers to certain height and weight findings suggestive of deviations from satisfactory health.

Determining weight. Obtain the weight of each pupil in September, January and May. Wherever possible use beam-type, platform scales. Before each weighing period check the scales; if they do not balance correctly, adjust them. Have the girl remove her shoes and as much other clothing as practicable (the weight measures used in developing the chart were taken on girls wearing undergarments only). With the girl standing near the center of the platform of the scales, her hands hanging free, determine weight to the nearest one-half pound.

Determining height. Use a metric measure fixed in the upright position, and a wood headpiece. The measure may be a yardstick, metal tape or paper scale; it should be fastened firmly to an upright board or to a smooth wall with no wainscoting. (An accurate paper scale may be purchased from the Institute of Child Behavior and Development, State University of Iowa.) Although a chalk box can serve as the headpiece, this is not recommended for regular use. A more satisfactory headpiece is easily made in the school workshop by joining at right angles the shorter edges of two pieces of seasoned wood 7 inches x 5 inches, and mounting within the 90° angle a triangular wood brace having an opening for insertion of the fingers.

Measure height with shoes removed. Have the girl stand with heels, buttocks and upper part of back in contact with the wall or board; feet almost together but not touching each other; arms hanging at the sides; heels in firm contact with the floor; head facing straight forward; and chin lifted but not tilted up. When she is positioned, place one face of the headpiece against the upright scale and bring the other face down, keeping it horizontal, until it crushes the girl's hair and makes contact with the top of her head. Take two separate measurements and record height to the nearest one-fourth inch.

Registering height and weight status. Assume you have determined the height and weight of May Atkin. May weighs 48 pounds, is 45 inches in height, and will have her fifth birthday tomorrow. Find age 5 below the *height* portion of the chart and 45 inches along its left-hand margin. Plot a point above 5 years and opposite 45 inches. Below this dot on the height portion of the chart write "45.0."

Next, find age 5 years below the *weight* portion of the chart and 48 pounds along its left-hand margin. Plot a point above 5 years and opposite 48 pounds. Above this mark in the weight portion of the chart write "48.0."

With the completion of these directions, the height and weight status of May Atkin at age 5 years is fully registered. At any age from 4 years to 18 years, the status of other girls can be registered similarly.

Registering height and weight progress. Assume May is now one year older. At age 5 years 4 months she weighed 50 pounds and had a height of 46 inches, at age 5 years 8 months she weighed 52 pounds and was 46.5 inches tall, and now at age 6 years she weighs 55 pounds and is 47.5 inches in height. Further, assume that points representing these records have been plotted correctly on May's chart. Having status records at more than one age, it becomes possible to draw *individual growth curves*, or lines of progress. May's progress between ages 5 years and 6 years can be depicted by drawing lines connecting (a) her points in the height part of the chart and (b) her points in the weight part of the chart.

Following the same procedure, height and weight progress of any individual girl may be portrayed over part or all of the period from age 4 years to age 18 years.

Interpreting status. (1) The figures written above or below the plotted points readily describe each girl's overall body size at the age or ages measures have been obtained.

(2) The channels in which a girl's height and weight points for a given age are located indicate her standings with reference to schoolmates of like age. The illustrative values given at age 6 years show May to be moderately tall and moderately heavy.

(3) When a girl's height and weight points do not lie in corresponding channels, the discrepancy may denote normal slenderness or stockiness of build, or it may reflect an undesirable state of health. Assume the chart shows a new pupil to be "average" in height and "light" in weight. She should be screened for medical study to determine whether she is a "satisfactorily healthy" girl of slender build, or a "medically unsatisfactory" girl with an incipient infection, a nutritional deficiency, or an unsuitable activity program.

Interpreting progress. (1) The difference between a girl's recorded heights (or weights) at two different ages gives the amount of change in the intervening period. For example, May Atkin between 5 and 6 years of age gained 2.5 inches in height and 7 pounds in weight.

(2) During the childhood span from age 4 years to age 9 years, normality of growth progress is indicated by approximately parallel relationship of the individual's height and weight lines with the channel lines of the chart. Suppose that Ruth Tweed has been measured successively from age 5 years to age 8 years. Her height line runs along the middle of the "average" height channel, while her weight line runs fairly close to the middle of the average weight channel until age 7 years then takes a steep turn upward. Ruth should be screened for medical investigation—her disproportionate gain in weight may reflect the need for a prescribed diet, a change in daily regimen, or drug therapy.

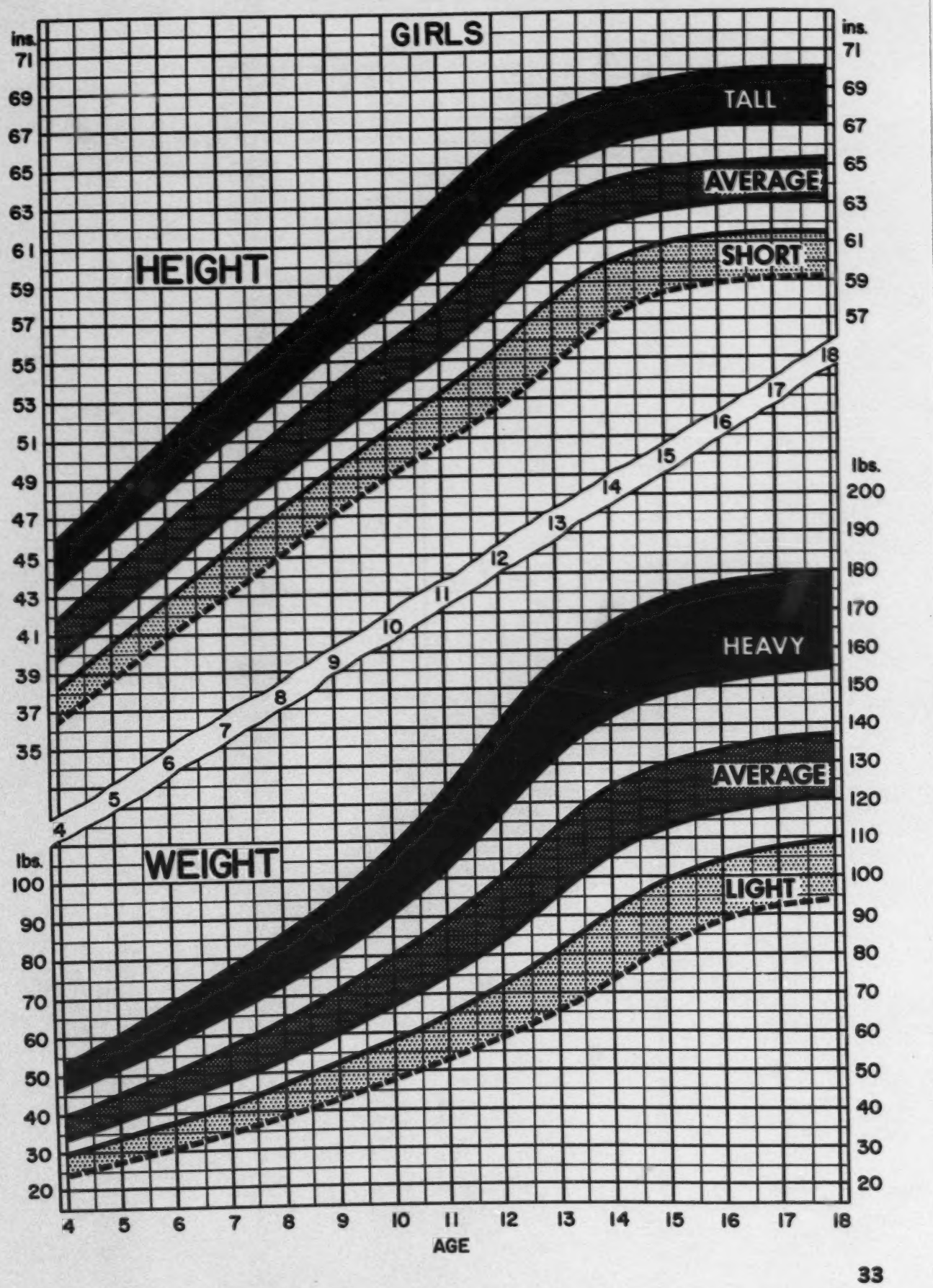
(3) Interpretations of growth progress after age 9 years are made on the same basis as earlier except that allowance must be made for individual differences in age of the circumpuberal "spurt" in height and weight. Suppose (a) Harriet and Elise are nearly alike in height and weight at each age from 5 to 9 years, and (b) the time of rapid adolescent growth in these measures begins before 10 years for Harriet and after 12 years for Elise. In the early teens when Elise is continuing to grow in height and weight at childhood rates, this growth should not be appraised as "unsatisfactory."

About the chart. The height and weight measurements for constructing the chart were collected in 1961 on white girls attending public and private schools in Iowa City, Iowa. To obtain the channels, age distributions for height and weight were subdivided as follows: Upper 10 percent (Tall, Heavy), next 20 percent, middle 40 percent (Average), next 20 percent, and lower 10 percent (Short, Light).

(girl's name) _____

(date of birth) _____

Grade: K 1 2 3 4 5 6 7 8 9 10 11 12 (encircle present grade)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